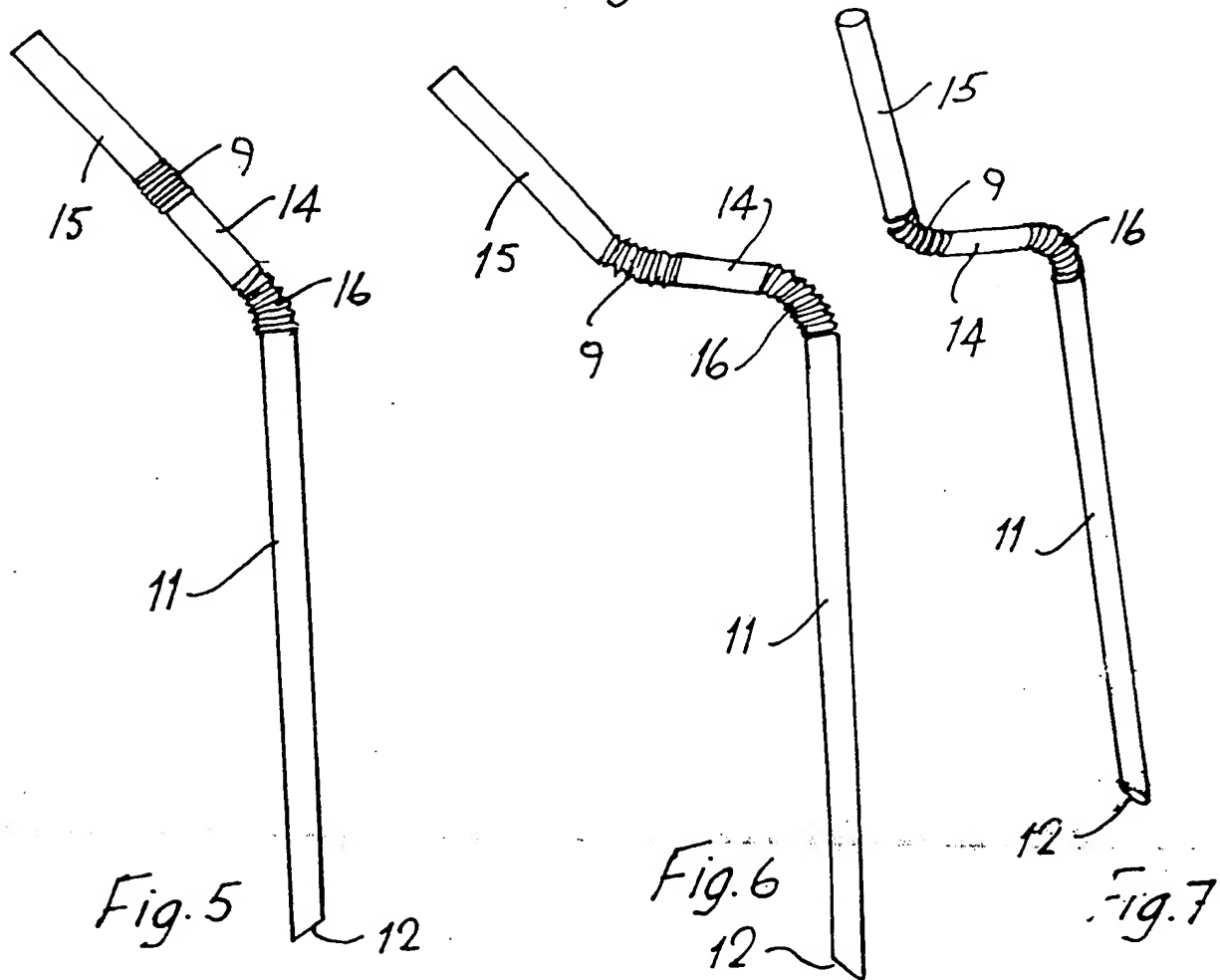
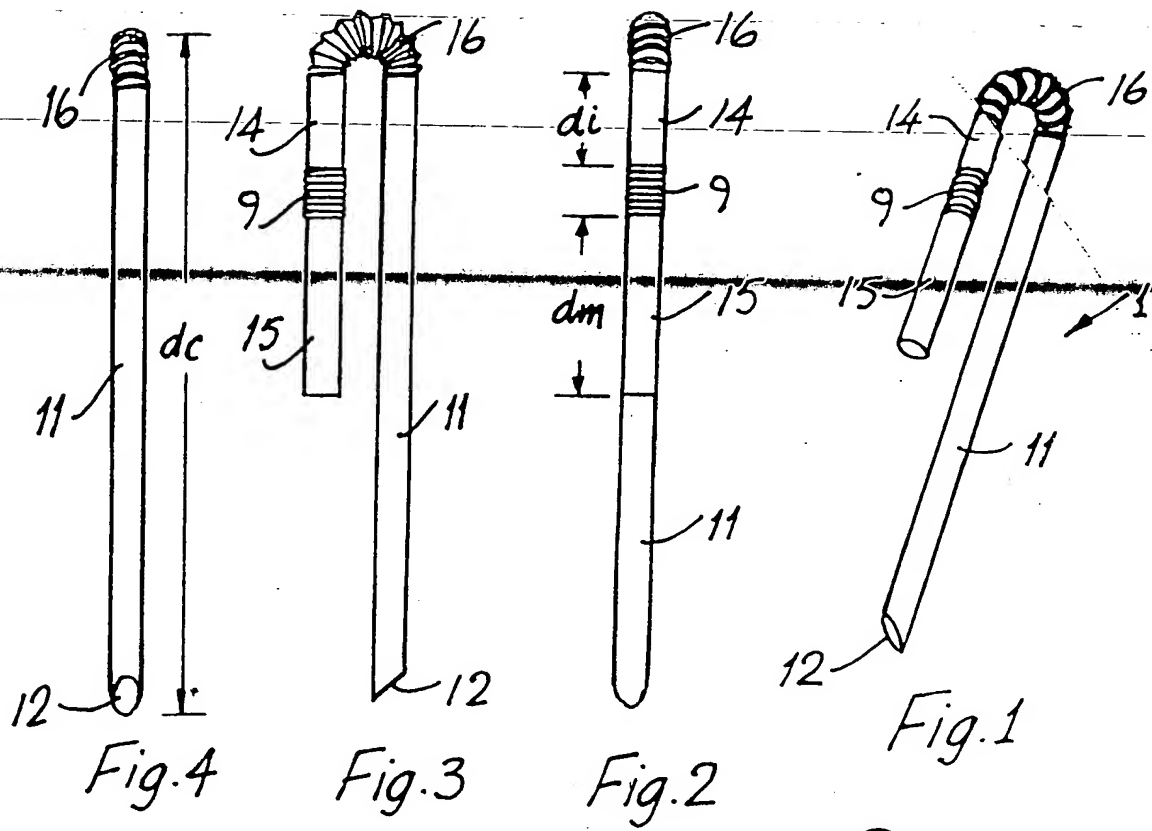
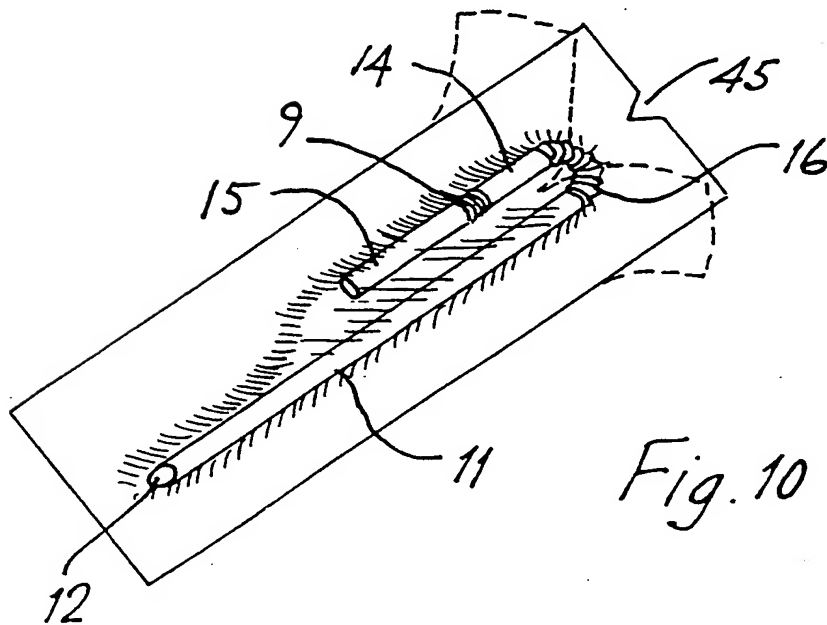
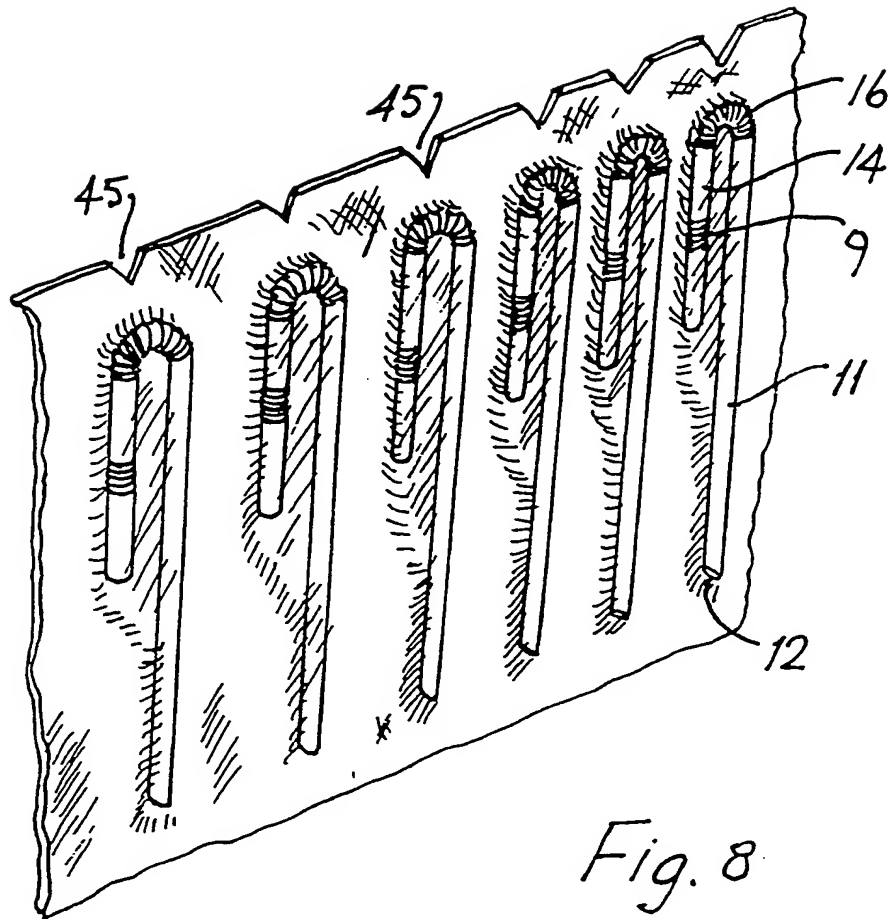


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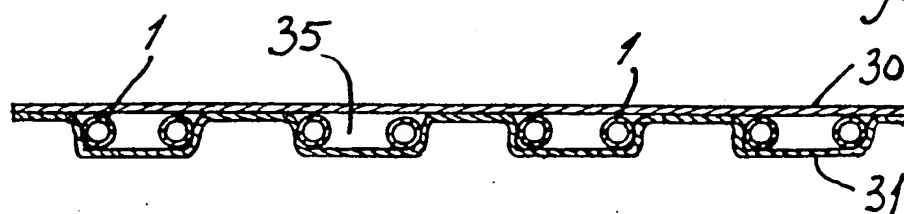
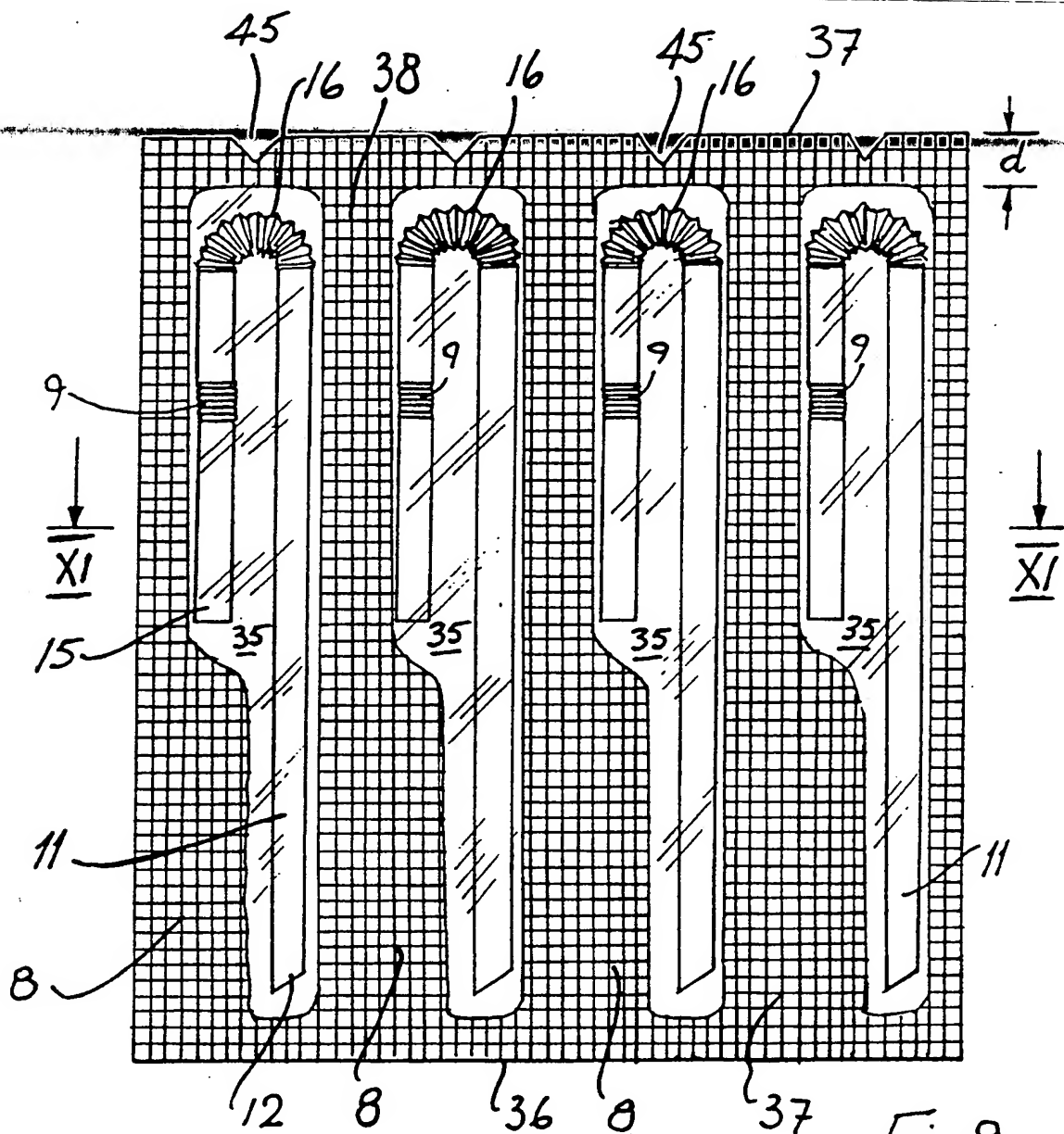
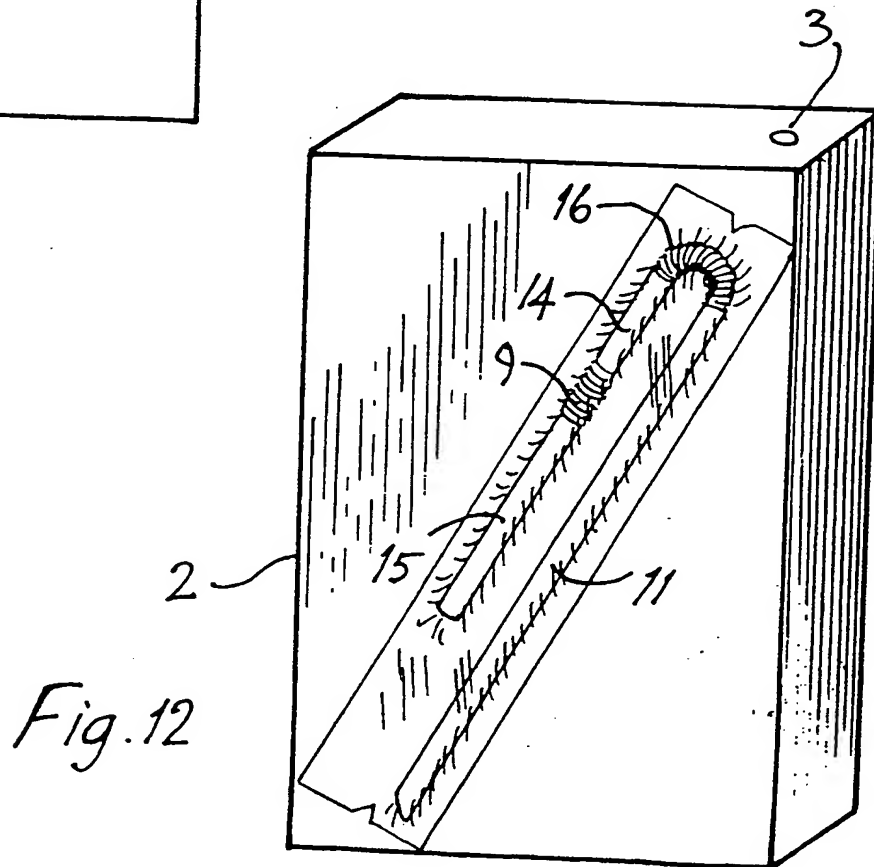
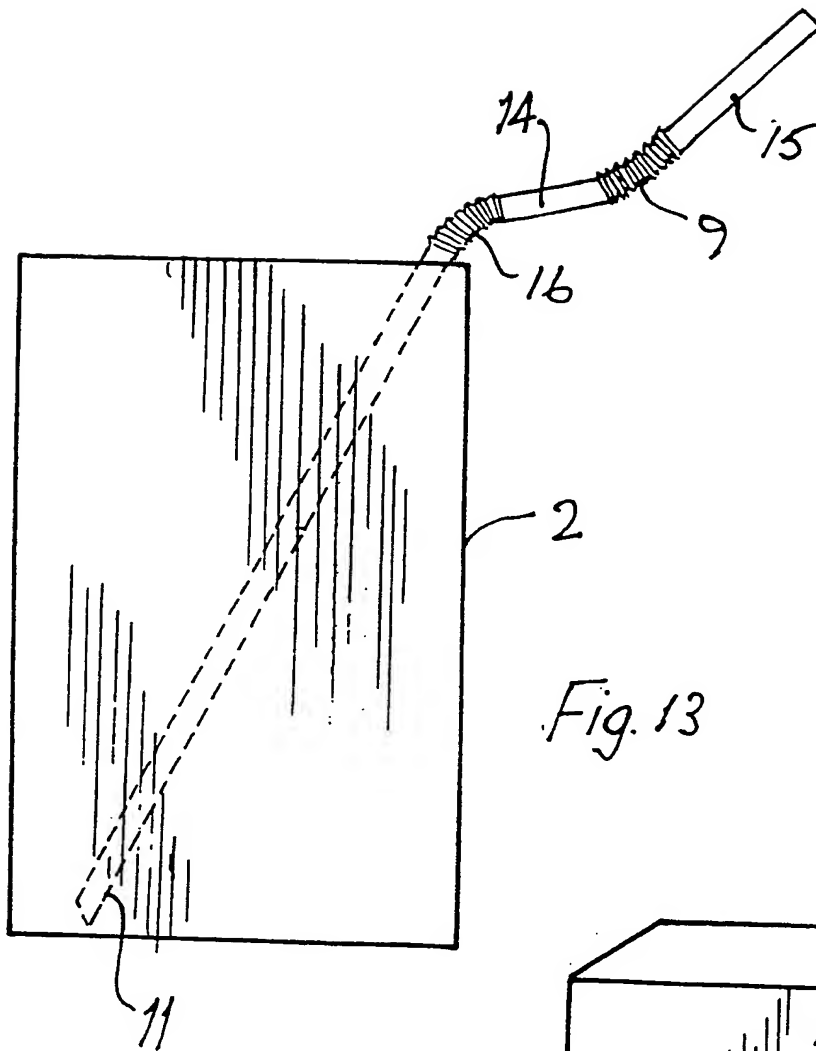


Fig. 11



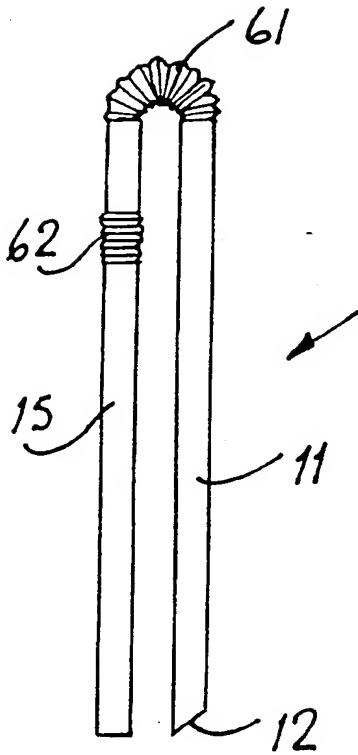


Fig. 14

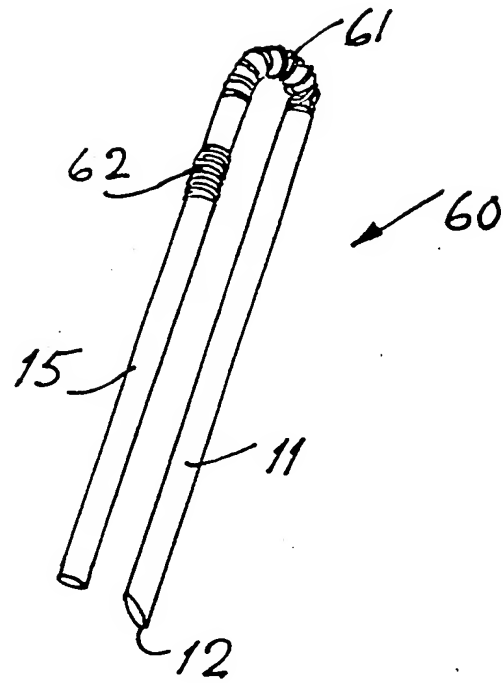


Fig. 15

- 1 -

"Foldable Plastic Straws"

The invention relates to foldable plastic straws.

According to one aspect, the invention provides a foldable plastic straw comprising a carton engaging portion, a mouth engaging portion and an intermediate portion, a first hinge portion between the carton engaging portion and the intermediate portion, and a second hinge portion between the intermediate portion and the mouth portion.

In one embodiment of the invention the intermediate portion and the mouth engaging portion extend, in a folded packaging configuration, substantially co-axially.

In a particular preferred embodiment of the invention, the ratio of the length of the intermediate portion to the length of the mouth engaging portion is from 1:4 to 4:1, preferably from 1:1 to 1:4 and most preferably approximately 1:3.

In one embodiment of the invention, the ratio of the length of the carton engaging portion to the overall length of the straw is at least 1:2, most preferably approximately 3:5.

In one embodiment of the invention, the foldable straw is housed within a pocket defined between two sheets of plastics material.

In another embodiment of the invention, at least one additional hinge portion is provided on the carton engaging portion of the straw.

In one arrangement, a hinge portion is located approximately at the mid point of the length of the straw so that in a folded packaging configuration the straw is folded into two portions of substantially equal length.

The invention also provides a carton having a foldable straw according to the invention mounted thereon.

In one embodiment of the invention, the carton has a substantially flat surface on which the foldable straw is mounted.

Most preferably, the carton is of generally brick shape and the foldable straw is mounted on a front or side face of the brick-shaped carton. Preferably, the brick shaped carton has an opening in an upper face thereof closed by a puncturable seal and the length of the carton engaging portion of the straw is such that the first hinge portion of the straw lies



adjacent to the opening in the carton when the straw is inserted therein. In one arrangement, the length of the carton engaging portion of the straw is such that the first hinge portion of the straw lies just outside of the opening in the carton when the straw is inserted therein.

In another aspect the invention provides a package of disposable foldable straws according to the invention, the package comprising a composite formed by at least two plastic sheets arranged in face-to-face relationship and being bonded together along the lengths thereof to define a plurality of spaced-apart closed pockets therebetween, each pocket being of generally elongate shape for housing a disposable foldable straw in a folded configuration.

Preferably, the pockets are spaced inwardly from each marginal edge of the sheets, the sheets being bonded together at a connecting section between adjacent pockets and the sheets having tear means for ease of tearing to remove a straw. Typically, the tear means comprises a lead-in tear portion adjacent at least one marginal edge for ease of tearing open the package to remove a foldable straw from a pocket. Most preferably, the lead-in tear portion extends from the marginal edge of the sheets towards the first hinge portion of the straw. Most preferably, the lead-in tear portion comprises a generally triangular shaped cut-out portion terminating in an apex adjacent to but not extending into the pocket.

In a preferred arrangement the cut-out portion extends for at least half the distance between the pocket and the adjacent marginal edge of the sheets.

In one embodiment of the invention secondary tear means are provided at each connecting section of the package between adjacent pockets. Typically, the tear means comprises a line of weakness extending across the connecting section between adjacent pockets.

In a preferred arrangement, the composite is formed by a pair of plastic sheets bonded together by heat sealing.

The composite may be wound up on a roll or layered for dispensing straws.

Typically, the sheets are of a polypropylene material.

In one arrangement, the mouth engaging portion of the straw extends in the folded position only partially along the carton engaging portion and the sheets are bonded together to closely follow the contour of the straw in the folded configuration.

The invention will be more clearly understood from the following description thereof, given by way of example only with reference to the accompanying drawings in which:-

Fig. 1 is a perspective view of a straw according to one embodiment of the invention,

Fig. 2 is a left-hand side view of the straw of Fig. 1,

Fig. 3 is a side elevational view of the straw of Fig. 1,

Fig. 4 is a right-hand view of the straw of Fig. 1,

Figs. 5 to 7 are views of the straw in different configurations of use,

Fig. 8 is a perspective view of a package incorporating a plurality of the straws,

Fig. 9 is a plan view of the package of Fig. 8,

Fig. 10 is a plan view illustrating the opening of one pocket of the package,

Fig. 11 is a typical cross-sectional view along the line XI-XI in Fig. 9, some section lines being omitted for clarity,

Fig. 12 is a perspective view of a carton according to the invention,

Fig. 13 is a view of the carton of Fig. 12 with a straw in a drinking position,

Fig. 14 is a perspective view of a straw according to another embodiment of the invention, and

Fig. 15 is a side elevational view of the straw of Fig. 14.

Referring to the drawings and initially to Figs. 1 to 13 thereof, there is illustrated a plastics disposable folding straw 1 according to the invention. The straw 1 comprises an elongate lower carton engaging portion 11 having a pointed end 12 for engaging a sealed hole 3 in a carton 2 or the like, an upper shorter mouth engaging drinking portion 15 and an intermediate portion 14. The carton engaging portion 11 and the intermediate portion 14 are interconnected by a connecting plastics first hinge portion 16, and a second plastics hinge portion 9 is provided between the intermediate portion 14 and the mouth engaging portion 15.

The ratio of the length  $d_i$  of the intermediate portion to the length  $d_m$  of the mouth engaging portion is from 1:4 to 4:1, preferably from 1:1 to 1:4 and most preferably approximately 1:3. The ratio of the length  $d_c$  of the carton engaging

portion to the overall length of the straw is at least 1:2 and preferably approximately 3:5.

The configuration of the straws and the length of the various portions of the straw are important particularly when the straw is to be used with a brick-shaped carton 2 as illustrated in Figs. 12 and 13. The configuration of the straw is such that the first hinge portion 16 preferably lies adjacent to or most preferably just outside the opening in the carton 2 when the straw is inserted therein as illustrated in Fig. 13. This ensures that the straw is easy for a user to insert into the carton 2 and to manipulate the straw into a desired drinking configuration. The provision of the hinge portions 9, 16 and their positioning allows the straw to be bent into a compact partial U-shape for fitting to cartons while at the same time allowing the straw to be bent into a number of different drinking configurations to suit a particular user as required and as illustrated in Figs. 5 to 7.

Referring to Figs. 8 to 11 a package for the straws 1 comprises a composite formed by two plastics sheets typically of polypropylene material namely a backing sheet 30 and a front sheet 31 arranged in face-to-face relationship and being bonded together by heat sealing along the lengths thereof to define a plurality of spaced-apart closed pockets 35, each pocket 35 housing a single straw 1 in the folded configuration. The pockets 35 are spaced inwardly from each

side marginal edge 36, 37 of the sheets 30, 31. It will be noted that the sheets 30, 31 are bonded together at a connecting section 38 between adjacent pockets 35. It will also be noted that the sheets are heat sealed in the region between the drinking portion and lower portion of the straws 1 to closely confine the straws 1 in the package and to allow for ease of attachment of the package to a carton or the like. For ease of removal of a straw 1 from its pocket 35 a lead-in tear portion 45 is provided adjacent the intermediate hinge portion 16 of the straws 1. It will be noted that the lead-in tear portion 45 comprises a generally triangular shaped cut-out portion terminating in an apex adjacent to but not extending into the pocket 35. The tear portion 45 extends for at least half the distance  $d$  between the pocket and the outer-marginal edges of the package to provide a package which remains closed in use but which can be readily opened to remove a single straw 1. Each of the pockets 35 is of a generally elongate shape.

Secondary tear means may also be provided across each connecting section 38 between adjacent pockets 35. The secondary tear means may comprise a line of weakness extending across the connecting section approximately mid way between adjacent pockets 35. The line of weakness is typically provided by perforating the sheets 30, 31 at the connecting section 38 between adjacent pockets 35.

In use, the package of disposable plastics folding straws 1 is typically rolled up into a roll or layered and the straws are dispensed from the roll or layers as desired by first removing a single section having a pocket 35 containing one straw 1. As will be apparent particularly in Fig. 10, a user grips the plastic sheets on either side of the cut-out 45 and applies a tearing force to extend the tear portion 45 into the pocket 35 as illustrated in Fig. 10 allowing the straw 1 to be easily removed from the pocket for use.

Referring to Figs. 14 and 15 there is illustrated another straw 60 according to the invention which is similar in arrangement and use to the straw, package and carton described above with reference to Figs. 1 to 13. Like parts are assigned the same reference numerals. In this case there are two hinge portions 61, 62. The first hinge portion 61 is provided at approximately the mid length of the straw to allow the straw 60 to be folded as illustrated. It will be appreciated that the straw 60 is shorter in the folded configuration than the straw of Figs. 1 to 13. This allows a smaller package to be used with the possibility of applying the straw to smaller cartons than has heretofore been possible. In this way a more compact package is produced which could possibly be more easily attached to cartons. In this arrangement it will be appreciated that the second hinge portion 62 may not be essential. When provided, such an

additional hinge portion may be provided at any desired location.

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The invention is not limited to the embodiments hereinbefore described which may be varied in both construction and detail.



CLAIMS

1. A foldable plastic straw comprising a carton engaging portion, a mouth engaging portion and an intermediate portion, a first hinge portion between the carton engaging portion and the intermediate portion, and a  
5 second hinge portion between the intermediate portion and the mouth portion.
2. A foldable straw as claimed in claim 1 wherein, the intermediate portion and the mouth engaging portion  
10 extend, in a folded packaging configuration, substantially co-axially.
3. A foldable straw as claimed in claim 1 or 2 wherein the ratio of the length of the intermediate portion to the length of the mouth engaging portion is from 1:4 to 4:1.
- 15 4. A foldable straw as claimed in claim 3 wherein the ratio is from 1:1 to 1:4.
5. A foldable straw as claimed in claim 3 or 4 wherein the ratio is approximately 1:3.
6. A foldable straw as claimed in any preceding claim  
20 wherein the ratio of the length of the carton engaging

portion to the overall length of the straw is at least 1:2.

7. A foldable straw as claimed in claim 6 wherein the ratio is approximately 3:5.
- 5 8. A foldable straw as claimed in any preceding claim housed within a pocket defined between two sheets of plastics material.
9. A foldable straw as claimed in claim 1 wherein at least one additional hinge portion is provided on the carton  
10 engaging portion of the straw.
10. A foldable straw as claimed in any preceding claim wherein a hinge portion is located approximately at the mid point of the length of the straw so that in a folded packaging configuration the straw is folded into two  
15 portions of substantially equal length.
11. A foldable straw substantially as hereinbefore described with reference to the accompanying drawings.
12. A carton having a foldable straw as claimed in any preceding claim mounted thereon.

13. A carton as claimed in claim 12 having a substantially flat surface on which the foldable straw is mounted.
14. A carton as claimed in claim 13 wherein the carton is of generally brick shape and the foldable straw is mounted on a front or side face of the brick-shaped carton.
15. A carton as claimed in claim 14 wherein the brick shaped carton has an opening in an upper face thereof closed by a puncturable seal and the length of the carton engaging portion of the straw is such that the first hinge portion of the straw lies adjacent to the opening in the carton when the straw is inserted therein.
16. A carton as claimed in claim 15 wherein the length of the carton engaging portion of the straw is such that the first hinge portion of the straw lies just outside of the opening in the carton when the straw is inserted therein.
17. A carton substantially as hereinbefore described with reference to the accompanying drawings.
18. A package of disposable foldable straws as claimed in any of claims 1 to 11, the package comprising a composite formed by at least two plastic sheets arranged in face-to-face relationship and being bonded together along the lengths thereof to define a plurality of spaced-apart

closed pockets therebetween, each pocket being of generally elongate shape for housing a disposable foldable straw in a folded configuration.

- 5 19. A package as claimed in claim 18 wherein the pockets are spaced inwardly from each marginal edge of the sheets, the sheets being bonded together at a connecting section between adjacent pockets and the sheets having tear means for ease of tearing to remove a straw.
- 10 20. A package as claimed in claim 19 wherein the tear means comprises a lead-in tear portion adjacent at least one marginal edge for ease of tearing open the package to remove a foldable straw from a pocket.
- 15 21. A package as claimed in claim 20 wherein the lead-in tear portion extends from the marginal edge of the sheets towards the first hinge portion of the straw.
22. A package as claimed in claim 21 wherein the lead-in tear portion comprises a generally triangular shaped cut-out portion terminating in an apex adjacent to but not extending into the pocket.
- 20 23. A package as claimed in claim 21 or 22 wherein the cut-out portion extends for at least half the distance

between the pocket and the adjacent marginal edge of the sheets.

24. A package as claimed in any of claims 18 to 23 wherein  
secondary tear means are provided at each connecting  
5 section of the package between adjacent pockets.
25. A package as claimed in claim 24 wherein the secondary  
tear means comprises a line of weakness extending across  
the connecting section between adjacent pockets.
26. A package as claimed in any of claims 18 to 25 wherein  
10 the composite is formed by a pair of plastic sheets  
bonded together by heat sealing.
27. A package as claimed in claim 26 wherein the composite is  
wound up on a roll or layered for dispensing straws.
28. A package as claimed in claim 27 wherein the sheets are  
15 of a polypropylene material.
29. A package as claimed in any of claims 26 to 28 wherein  
the mouth engaging portion of the straw extends in the  
folded position only partially along the carton engaging  
portion and the sheets are bonded together to closely  
20 follow the contour of the straw in the folded  
configuration.

30. A package substantially as hereinbefore described with reference to the accompanying drawings.
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- 17 -

**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number  
 9122856.9

**Relevant Technical fields**

(i) UK CI (Edition K ) A2B (BAAB)

(ii) Int CI (Edition 5 ) A47G 21/18

**Databases (see over)**

(i) UK Patent Office

(ii)

Search Examiner

R HONEYWOOD

Date of Search

7 JANUARY 1992

Documents considered relevant following a search in respect of claims 1-30

| Category<br>(see over) | Identity of document and relevant passages                 | Relevant to<br>claim(s) |
|------------------------|--|-------------------------|
| X                      | GB 1412604 A (FRIEDMAN) particularly page 2<br>lines 71-76 | 1 at<br>least           |
| X                      | EP 0327244 A1 (ELOPAK SYSTEMS AG)                          | 1 at<br>least           |
| X                      | US 4728001 A (SERBIA)                                      | 1 at<br>least           |
| X                      | US 4582213 (PARK) particularly Figure 4                    | 1 at<br>least           |
| X                      | US 4462503 (DI RAFFAELE)                                   | 1 at<br>least           |
| X                      | US 4247016 (SHAW)  | 1 at<br>least           |

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